HILL ENGINEERING, INC.
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January 30, 2006

Mr. Mark J. Shaw, Esq.
MacDonald, Illig, Jones & Britton, LLP
100 State Street, Suite 700
Erie, PA 16507-1459

Reference: Kearsarge Pump Station ORF
Millcreek Township Sewer Authority

Dear Mr. Shaw:

I have been retained by Millcreek Township Sewer Authority (MTSA) and Millcreek Township (MT) to provide an expert opinion and independent evaluation of the proposed Overflow Retention Facility (ORF) for the Kearsarge Sanitary Sewer Pump Station, and of the Plaintiff's Demand for Relief in the nature of operating procedures and stream assessment and mitigation. I am being compensated at a rate of $85 per hour for these services.

I reviewed numerous documents you provided regarding the proposed Kearsarge Pump Station Upgrades and Overflow Retention Facility being constructed by the MTSA. These documents included infiltration/inflow studies, Act 537 Studies and Addendums, correspondence from the design engineer, Consent Order and Agreements, Agreement with the City of Erie, construction specifications, construction drawings and Walnut Creek water quality data. A list of documents provided is attached.

This letter summarizes current problems at the Kearsarge Pump Station, the alternatives analyzed and the proposed project solution. Per your request, my professional opinions are provided with respect to the basis of design, operating procedures and water quality impacts.

Current Problems

A bypass was installed on the Kearsarge Pump Station force main in December 1988. This bypass was installed to minimize sewage back-ups and associated basement flooding in service areas tributary to the pump station. This bypass is operated if wet well levels at the pump station become too high causing back-ups and to minimize risks to public health and safety.

From December 1999 through December 2005, the Millcreek Township Sewer Authority (MTSA) reported 19 overflow (bypass) events at the Kearsarge Pump Station. One (1) of these overflow events was related solely to a mechanical failure. The other 18 events all occurred during wet weather conditions.

The Consent Order and Agreement (CO&A) between the PA Department of Environmental Protection (PA DEP), MTSA and MT dated November 5, 2003, required the MTSA and MT to evaluate alternatives and implement a project which would eliminate overflows at the Kearsarge Pump Station. The CO&A limits connections tributary to the pump station and provides stipulated penalties for overflow events.

Alternatives Analyzed

The MTSA utilized Consoer Townsend Envirodyne Engineers, Inc. (CTEE) to investigate the problem, complete Act 537 studies, evaluate alternatives and develop a proposed solution. CTEE is a large and nationally recognized engineering firm with expertise in sanitary engineering. CTEE has now become part of Metalf and Eddy, which is a similar type of engineering firm.

CTEE evaluated several alternatives as part of the Act 537 Plan and special studies. These alternatives included infiltration/inflow (I/I) abatement, maximize forward pumping and overflow storage.

Over the last several years, the MTSA has completed infiltration/inflow studies and abatement projects. Prior efforts by MTSA at infiltration/inflow abatement have not been successful in eliminating the overflow at the Kearsarge Pump Station. The 2003 CO&A did not list infiltration/inflow abatement as an alternative to be evaluated. The Overflow Abatement Alternative Report dated August 13, 2003 by CTEE stated "I&I abatement has been ruled out as an alternate solution by the PA DEP who has stated that they would not accept this as a solution". Therefore, given the position of the PA DEP, the sole use of I/I abatement to address overflows at the pump station was not an option.

Maximization of forward pumping capacity is restricted due to current limitations on MTSA and MT in their Agreement with the City of Erie dated August 6, 1997. The Kearsarge Pump Station and other areas in Millcreek Township eventually discharge to the Manor Drive interceptor in the City of Erie. The referenced Agreement limits the Manor Drive interceptor ultimate peak flow capacity to 30.5 MGD for Millcreek, Fairview and Summit Townships (23.25 MGD for Millcreek alone). The City of Erie sanitary sewer system was designed to handle only those peak flows, and if MTSA and MT were to significantly exceed the design peak flows, there is potential for downstream overflows and surcharging.

Reports by CTEE indicate that a second downstream connection to reduce flows on the Manor Drive interceptor is not acceptable to the City of Erie.

The Act 537 Special Study Addendum dated May 17, 2005 prepared by CTEE indicates that the maximum forward pump capacity at the Kearsarge Pump Station should not exceed 4500 gpm during wet weather storm events in order to prevent exceedence of the flow limitation in the Agreement.

Since there are significant limitations on the ability to increase forward pump capacity, CTEE concluded that overflow storage was required. CTEE evaluated several design storms and corresponding storage volumes. Selection of the overflow storage volume is discussed under the "Basis of Design" section of this letter.

In my professional opinion, increasing forward pumping capacity in an amount sufficient to eliminate required overflow storage is not a viable option, given the current Agreement and City of Erie capacity limitations. In my professional opinion, an overflow retention facility (ORF) is required at the pump station.

Proposed Project

The proposed project involves construction of storage tanks at the Kearsarge Pump Station to store excess flows which exceed forward pumping capacity. The stored wastewater is drained to the forward pump station after flows subside.

The proposed project was designed by CTEE and includes the following major items:

- Replacement of the three (3) existing pumps at the Kearsarge Station ("forward pumps") to increase the design capacity of the pump station from approximately 3600 to 4500 gpm, with two (2) pumps operating.

- Construction of a "storage pump station" consisting of three (3) submersible pumps with a design capacity of 4500 gpm, with two (2) pumps operating.

- Construction of two (2) storage tanks, each with a capacity of approximately 1,150,000 gallons. Each tank will be approximately 56 feet in diameter and 65 feet high.

- Installation of a 750 KW electric standby generator capable of operating all facilities during a power outage.

- Associated piping, structures, instrumentation and controls.

The existing bypass piping will be removed when construction is completed.

Construction is anticipated to begin in Spring 2006 and is expected to be completed in or before March 2007.

Basis of Design

In order to design an overflow abatement project, influent flows, pumped flow rates and bypass volumes need to be reasonably determined and verified.

During the design investigation work, CTEE discovered that the pump station discharge flow meter was inaccurate. CTEE conducted wet well drawdown tests to establish a calibration multiplier for this pump station discharge meter to provide accurate flow data for design purposes.

CTEE used three (3) separate flow meters in lines upstream of the pump station to determine flows into the station. CTEE reports that these flow meters were routinely calibrated and properly maintained. The Act 537 Special Study dated June 2004 by CTEE shows that the influent flow meters correlate well with the recalibrated pump station discharge meter. As such, CTEE concluded that the recalibrated pump station flow meter could be relied upon for design analysis.

Bypass volumes were estimated by CTEE by analyzing pumped flow rates, force main pressures and pump characteristics.

CTEE reviewed several possible storage tank sizes in reports, correspondence and preliminary design work from 2003 to 2005.

The basis for the current design is provided in the Act 537 Special Study Addendum dated May 17, 2005, prepared by CTEE. In this Addendum Report, CTEE used the September 8-9, 2004 storm event (remnants of Hurricane Frances) to design the ORF.

During this storm event, approximately 4½ inches of rain fell in approximately 12-hours. CTEE estimates this is equivalent to a 50 year recurrence interval.

The CTEE Report used pump station flows during the September 8-9 storm event, added 10 year future growth projections and subtracted the maximum sustained forward pumping capacity of 4500 gpm to determine required storage tank volume. These calculations showed a required storage volume of 2,212,075 gallons. CTEE recommended a storage tank volume of 2,300,000 gallons and believed that this volume would accommodate a 50 year design storm recurrence interval.

For comparison, the Agreement between the City of Erie and MTSA dated August 6, 1997, states that the design storm event used to size the City's eastside and westside conveyance systems was a 1.06 inch rainstorm event, approximately 2-hours in duration with at least 3 days of antecedent dry weather conditions (occurred on August 11, 1995).

This design storm event used to size the City of Erie sewer conveyance systems, is much less intense and has a lower recurrence interval (less than 2 years) than the design storm event used by CTEE to size the Kearsarge Pump Station ORF. It should also be noted there was no overflow at the Kearsarge Pump Station on the design day selected by the City of Erie for their system upgrades.

The PA DEP Domestic Wastewater Facility Manual states the following with regards to design aspects for emergency operation of pump stations:

> "Pumping stations and collection systems shall be designed to prevent or minimize bypassing of raw wastewater. For use during possible periods of extensive power outages, mandatory power reductions or storm events, consideration should be given to providing a controlled, high-level wet well overflow to supplement alarm systems and emergency power generation in order to prevent backup of wastewater into basements, or other discharges which may cause severe adverse impacts on public interests, including public health and property damage. Where a high-level overflow is utilized, consideration shall also be given to the installation of storage detention tanks or basins, which shall be made to drain to the station wet well. Where such overflows affect public water supplies, shell fish production or waters used for culinary or food processing purposes, a storage detention basin or tank shall be provided having a two-hour detention capacity at the anticipated overflow rate".

In reference to the DEP Manual, Walnut Creek is not used for public water supply, shell fish production or food processing purposes. The detention capacity provided at the maximum assumed storage pumping rate of 4500 gpm is approximately 8.5 hours, which exceeds the DEP design standard, even though the receiving stream does not have the listed critical uses.

The PA DEP does not have a formal design standard for recurrence interval on storm events to prevent overflows in separate sanitary sewer systems. Based on discussions with PA DEP personnel, it is our understanding that some of the DEP regional offices use a 2 year, 24-hour storm event as an informal design guideline for preventing overflows. The 2 year, 24-hour storm equates to about 2.56 inches of rain for the Erie area. This 2 year, 24-hour storm design event is based upon a memorandum from EPA Region III to the PA DEP dated July 14, 1995.

The use of a 50 year storm event to size the Kearsarge ORF is considered conservative based on my experience and guidelines provided by the PA DEP. Thus, in my professional opinion, MTSA is implementing a remedy that exceeds standards used by other municipalities in similar situations. Designing for the maximum possible flow to prohibit any type of overflow event in the future is not customary or practical. Given the above factors, in my professional opinion, the ORF sizing selected by CTEE is sufficient and does not need to be increased.

The proposed Kearsarge Pump Station Upgrades and ORF incorporate the following design features:

- Expansion and upgrade of existing forward pumps and new flow meter.
- Automated controls for pumping and tank draining. Automated alarms connected to the MTSA SCADA system.
- Complete standby electric generating capability.
- Service platforms with high pressure water cannons for tank cleaning.
- Quick access door to tank interior for inspection.
- Remote cameras mounted on top of tanks to view contents.
- Gravity overflow to storage pumps which minimizes discharge of floatables.
- Third standby pump for both forward and storage pumping stations.
- Use of variable speed pumps.
- Tank drain line is screened prior to entering wet well.
- Pipe cleanouts and isolation valves are provided.

CTEE evaluated potential odor control through aeration or chemical addition. Inspections of other ORF facilities by CTEE and MTSA did not indicate odor as a problem due to the diluted wastewater and anticipated storage times. Provisions for chemical addition for odor control are provided, if necessary.

In my professional opinion, the Kearsarge Pump Station design features should allow the system to function properly and reliably and facilitate removal of the bypass.

Operating Procedures

Correspondence and reports from CTEE outline operating procedures for the Kearsarge Pump Station and ORF, which are as follows:

- The forward pump flow will be automatically controlled to limit flow to 4500 gpm to maintain compliance with the City Agreement and keep flows from exceeding downstream capacity limitations.

- When flows entering that station exceed 4500 gpm, the wet well level will increase, such that it will be diverted by gravity pipe to the storage pump station. This diversion level was set to prevent basement flooding in upstream service areas.

- Level controls are provided in the storage pump wet well to automatically run the pumps to convey diverted wastewater to the storage tanks.

- When forward pump rates are below 4500 gpm and forward wet well level has dropped below the diversion elevation, stored wastewater is returned at a controlled rate to the forward wet well through an automatic modulating drain valve. This will allow the stored wastewater to be retuned to the system as soon as possible.

- Storage tank levels will be continuously monitored by a pressure transducer in the storage pump valve pit, which allows for proper operation.

- If incoming flows exceed 9000 gpm during extreme flow events (total of forward and storage pumping) the forward wet well level will increase to a point whereby the controls limiting forward flow to 4500 gpm will be automatically removed to allow a higher pumping rate to the City. CTEE estimates that forward flows could be increased to approximately 5500-6000 gpm during these extreme flow events. If this high wet well level is reached, an alarm will be automatically activated and MTSA personnel will be notified through the SCADA system.

- Automatic alarms to the SCADA system are provided for wet well levels, flow set points, storage tank level, pump faults and other critical parameters. When these alarms are triggered, MTSA personnel are notified and can then take appropriate action.

In my professional opinion, the operating procedures, controls, alarms and SCADA system specified, are sufficient for this facility and should provide reliable operation in order to maintain compliance with the Clean Water Act.

Water Quality Impacts

The Kearsarge Pump Station is located adjacent to Walnut Creek. Overflows from the pump station are discharged to Walnut Creek. Walnut Creek in the vicinity of the pump station also receives storm water runoff from the Millcreek Mall and adjacent residential areas.

The MTSA reported 23 overflow events from December 1992 through December 2005. During this December 1992 through December 2005 time period, there were prolonged periods in which no overflows occurred at the Kearsarge Pump Station. Time periods when no overflows occurred were: December 31, 1992 – September 16, 1996 (3 years, 9½ months); January 9, 1998 – December 14, 1999 (1 year, 11 months); November 8, 2000 – August 16, 2001 (9¼ months) ; and May 13, 2002 – September 28, 2003 (1 year, 4½ months).

From December 1999 to December 2005, the overflow at the Kearsarge Pump Station has been utilized for a total of approximately 120 hours. There were a total of about 52,560 hours during this 6 year period. The overflow occurred only 0.23% of the time, which would be equivalent to about 20 hours per year on average.

Based on the frequency and duration of the overflow events and my experience with other systems, I do not believe that the overflows at the Kearsarge Pump Station could be considered as frequent or chronic.

Almost all of the overflow events occurred during significant wet weather or snow melt conditions. The base flow to the pump station during dry weather, low groundwater conditions is estimated to be less than 700 gpm. The overflow diversion usually begins to occur when station flows reach about 4500 gpm. As such, the wastewater overflow is significantly diluted by infiltration/inflow, with a dilution factor of at least 5 to 1.

Wet weather in the Kearsarge Pump Station service area causing an overflow, would also cause a corresponding increase in stream flow in Walnut Creek. The higher stream flow would minimize water quality impacts of overflow events.

From December 30, 1992 through November 29, 2005, the MTSA estimated the overflow from the Kearsarge Pump Station totaled approximately 16.8 million gallons. Using the above listed dilution factor, actual sewage in the overflow is estimated to be approximately 2.8 million gallons over this time period. In determining water quality impacts, it is important to put the overflow volume in perspective with the total Walnut Creek stream flow over this same time period. We estimate the annual mean stream flow in Walnut Creek at the Kearsarge Pump Station to be approximately 13.8 million

gallons/day. This stream flow estimate is based on USGS gauging data at a nearby stream and actual drainage area of Walnut Creek at the Kearsarge Pump Station. The total Walnut Creek stream flow over this 12 year, 11 month period is estimated to be about 65 billion gallons. The actual volume of sewage in the pump station overflow during this time period represents only about 0.004% of the total stream flow. Therefore, sewage discharged through the pump station overflow is insignificant when compared to stream flow. This indicates there is no significant potential for long term water quality impacts due to the overflow.

In August 2005, the Erie County Health Department (ECHD) analyzed samples of Walnut Creek for fecal coliform bacteria. On August 31, 2005 a sample of Walnut Creek taken approximately 50 yards upstream of the Kearsarge overflow showed a fecal coliform level of 10,900/100 mL. Another sample taken that same day at the mouth of Walnut Creek, downstream of the Kearsarge Pump Station, had a fecal coliform level of 10,400/100 mL. On August 30-31, 2005, there was 2.21 inches of rainfall reported at the Erie Airport. As such, stream flows in Walnut Creek were elevated. There was no overflow event at the Kearsarge Pump Station on these days.

Samples taken at the mouth of Walnut Creek by ECHD on August 5, 10, 17 and 25, 2005 during dry conditions show fecal coliform levels ranging from 45 to 110/100 mL.

On November 25, 2001, a sample of Walnut Creek downstream of the Kearsarge Pump Station (near Sterrattania and Streamwood Drive) showed fecal coliform results of too numerous to count (TNTC). There had not been any overflow from the Kearsarge Pump Station for approximately 3 months before this sample was collected. There are areas near this sample location that do not have public sewer service.

For comparison of sample results, the fecal coliform standard for public bathing places is a maximum geometric mean of 200/100 mL.

Gannon University provided us water quality data for Walnut Creek collected in 2005. During this sample collection period (5/24/05-10/05/05), there were no overflow events at the Kearsarge Pump Station. The Gannon Walnut Creek data provides two sample locations, one just upstream of the Kearsarge Pump Station and the other downstream between Route 5 and the mouth. Five samples were collected on different days at each sample location.

At the downstream sample location, the Gannon data shows high E coli counts (TNTC and 2900) during wet weather periods and zero (0) E coli during dry weather periods. A relatively high phosphate result was also obtained during wet weather at the downstream sample location. This is indicative of non-point source runoff.

At the sample location just upstream of the Kearsarge Pump Station, the Gannon data showed levels of E coli ranging from 0-450, with no samples taken during high stream flow conditions.

The sampling data discussed above indicates that during dry conditions, Walnut Creek downstream of the pump station had relatively low levels of fecal coliform and E coli bacteria. The data also shows that during wet weather, fecal coliform and E coli levels were dramatically increased due to factors other than the pump station overflow. These other factors which could increase bacteria levels in the stream include surface runoff, storm water discharges and malfunctioning septic systems.

On January 13, 2006, I viewed Walnut Creek in the vicinity of the Kearsarge Pump Station. There were no visible signs in or along the stream which would indicate a recent or frequent overflow events. Also, I did not notice any visible signs of water quality degradation.

Based on the above analysis, in my professional opinion, the stream assessment and mitigation sought by the Plaintiffs in this case is unnecessary because there is no indication there has been any measurable water quality degradation in Walnut Creek related to the Kearsarge Pump Station overflow, for the following reasons:

- Overflows are not frequent.
- Wastewater is diluted when overflows occur.
- Stream flow is relatively high when overflows occur.
- Overflow volume is small compared to stream flow.
- Sampling data and site observations do not indicate water quality degradation due to the overflow.

If you have any questions, please contact me.

Sincerely,

HILL ENGINEERING, INC.

August E. Maas, P.E.

August E. Maas, P.E., President

EDUCATION

B.S., Civil Engineering, 1979
University of Pittsburgh

MBA, Management and Finance, 1989
Pennsylvania State University

PROFESSIONAL REGISTRATION

P.E., Pennsylvania 1983
P.E., New York 1987
P.E., Ohio 1990
P.E., Georgia 1996

RESPONSIBILITIES

Mr. Maas is a Professional Project Engineer in responsible charge of planning and design of municipal public works projects, specializing in the fields of wastewater and water treatment technology.

Mr. Maas has been employed by the company for nearly twenty years. Prior to working for Hill Engineering, Inc. he was employed for five years by the Pennsylvania Department of Environmental Resources (Meadville Office) where he was responsible for reviewing plans for permitting water and wastewater systems, stream modeling to establish effluent limits, and value engineering cost recommendations.

Mr. Maas has also served as project manager including design and supervision of construction for numerous public works projects by Hill Engineering, Inc. including:

- Ellwood City Borough Wastewater Treatment Plant and sewer system repairs, project cost of $20 million.
- Borough of Edinboro air stripping tower , pump station and emergency generators.
- Summit Township Water System including pump stations, storage tanks, well supplying, over 50 miles of water lines. Total system costs exceeding $15 million.
- Meadville Area Sewer Authority sanitary sewer system improvements. Total project costs of approximately $6 million.
- Ellport Borough Sewer Authority Plant Expansion. Total project cost of approximately $3.1 million.

- Municipal Authority of the Borough of Mansfield earthen dam, water transmission line, water treatment plant and reservoir. Total project costs of approximately $2.5 million.

- North East Borough wastewater treatment plant improvements. Total project costs of approximately $16 million.

- Albion Borough Wastewater Treatment Plant upgrades. Project costs of $4.5 million.

- Borough of Ridgway water treatment plant improvements including filtration, chemical feed, clearwell, effluent pumping and sludge treatment/dewatering. Total project costs approximately $5.1 million.

- Borough of Ridgway wastewater treatment plant improvements. Total project costs of approximately $9.4 million.

- Peek'n Peak Recreation, Inc. wastewater treatment plant and water supply.

- Ulysses Municipal Authority pump station, well houses, chlorination facilities, water line extensions and new wastewater treatment plant.

While employed with the PA DEP, Mr. Maas conducted stream surveys to prepare models for analysis of impacts of pollutant discharges and to determine effluent limits for proposed and existing discharges. Mr. Maas also participated in aquatic surveys and studies. With Hill Engineering, Inc. Mr. Maas has developed stream monitoring programs and reviewed numerous stream aquatic surveys which analyzed pollutant impacts. Mr. Maas has also reviewed data for several dischargers to determine potential stream impacts in order to analyze required treatment facilities.

EXHIBITS TO
EXPERT REPORT OF AUGUST E. (GUS) MAAS

EXHIBIT NO.	DESCRIPTION
1	Summary of Proposed Kearsarge Project
2	Drawing - Proposed Site Plan (MSA-MT 7522)
3	Photo of Pump Station Buildings (MSA-MT 7562)
4	Photo of Pump Station Buildings (MSA-MT 7563)
5	Photo of Inside View of Pump Station (MSA-MT 7564)
6	Photo of Location of Overflow Retention Facilities (MSA-MT 7565)
7	Special Study Addendum (MSA-MT 2843 - 2947)
8	Point Precipitation Frequency Estimates From NOAA (MSA-MT 7644 - 7648)
9	Addendum to Agreement -City of Erie/Millcreek Township/ Erie Sewer Authority/Millcreek Township Sewer Authority) (PL 634-PL652)
10	PaDEP Domestic Wastewater Facilities Manual (Doc. ID #362-0300-001 - 10/97) (DEP 00638 - 00755)
11	EPA Memo Re: Sizing Wet Weather Detention (7/14/95) (MSA-MT 7649)
12	Kearsarge Project Key Design Features
13	Kearsarge Project Operating Features
14	Brandy Run USGS Data (MSA-MT 7650)
15	Map of Walnut Creek Drainage Area (MSA-MT 7651)
16	Calculation Re: Walnut Creek Flows (MSA-MT 7652)
17	Walnut Creek Sample Results - ECHD (ECHD 0001)
18	NOAA Weather Data - 8/30/05 - 8/31/05 (MSA-MT 7653 - 7654)

EXHIBITS TO
EXPERT REPORT OF AUGUST E. (GUS) MAAS

EXHIBIT NO.	DESCRIPTION
19	Walnut Creek 1 Sample Results - Gannon University (MSA-MT 7655)
20	Walnut Creek 2 Sample Results - Gannon University (MSA-MT 7656)
21	Walnut Creek Sample Results - Hill Engineering (MSA-MT 5214 - 5227)
22	Photo of Walnut Creek Immediately Upstream of the Overflow (MSA-MT 7566)
23	Photo of Walnut Creek Looking Upstream Towards the Overflow (MSA-MT 7567)
24	Photo of Walnut Creek Downstream of the Overflow (MSA-MT 7568)
25	Photo of Walnut Creek Downstream of the Overflow (MSA-MT 7569)

SUMMARY OF PROPOSED PROJECT

- Replacement of the three (3) existing pumps at the Kearsarge Station ("forward pumps") to increase the design capacity of the pump station from approximately 3600 to 4500 gpm, with two (2) pumps operating.

- Construction of a "storage pump station" consisting of three (3) submersible pumps with a design capacity of 4500 gpm, with two (2) pumps operating.

- Construction of two (2) storage tanks, each with a capacity of approximately 1,150,000 gallons. Each tank will be approximately 56 feet in diameter and 65 feet high.

- Installation of a 750 KW electric standby generator capable of operating all facilities during a power outage.

- Associated piping, structures, instrumentation and controls.

- The existing bypass piping will be removed when construction is completed.

KEARSARGE PROJECT KEY DESIGN FEATURES

- Expansion and upgrade of existing pumps and new flow meter.
- Automated controls for pumping and tank draining. Automated alarms connected to the MTSA SCADA system.
- Complete standby electric generating capability.
- Service platforms with high pressure water cannons for tank cleaning.
- Quick access door to tank interior for inspection.
- Remote cameras mounted on top of tanks to view contents.
- Gravity overflow to storage pumps which minimizes discharge of floatables.
- Third standby pump for both forward and storage pumping stations.
- Use of variable speed pumps.
- Tank drain line is screened prior to entering wet well.
- Pipe cleanouts and isolation valves are provided.
- CTEE evaluated potential odor control through aeration or chemical addition. Inspections of other ORF facilities by CTEE and MTSA did not indicate odor as a problem due to the diluted wastewater and anticipated storage times. Provisions for chemical addition for odor control are provided, if necessary.

KEARSARGE PROJECT OPERATING PROCEDURES

- The forward pump flow will be automatically controlled to limit flow to 4500 gpm to maintain compliance with the City of Agreement and keep flows from exceeding downstream capacity limitations.

- When flows entering the station exceed 4500 gpm, the wet well level will increase, such that it will be diverted by gravity pipe to the storage pump station. This diversion level was set to prevent basement flooding in upstream service areas.

- Level controls are provided in the storage pump wet well to automatically run the pumps to convey diverted wastewater to the storage tanks.

- When forward pump rates are below 4500 gpm and forward wet well level has dropped below the diversion elevation, stored wastewater is returned at a controlled rate to the forward wet well through an automatic modulating drain valve. This will allow the stored wastewater to be returned to the system as soon as possible.

- Storage tank levels will be continuously monitored by a pressure transducer in the storage pump valve pit, which allows for proper operation.

- If incoming flows exceed 9000 gpm during extreme flow events (total of forward and storage pumping), the forward wet well level will increase to a point whereby the controls limiting forward flow to 4500 gpm will be automatically removed to allow a higher pumping rate to the City. CTEE estimates that forward flows could be increased to approximately 5500 - 6000 gpm during these extreme flow events. If this high wet well level is reached, an alarm will be automatically activated and MTSA personnel will be notified through the SCADA system.

- Automatic alarms to the SCADA system are provided for wet well levels, flow set points, storage tank level, pump faults and other critical parameters. When these alarms are triggered, MTSA personnel are notified and can then take appropriate action.

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA

ERIE COUNTY ENVIRONMENTAL COALITION, PENNENVIRONMENT, INC. and THE GAIA DEFENSE LEAGUE, Plaintiffs	)	
v.	)	CIVIL ACTION NO. 05-59 ERIE
MILLCREEK TOWNSHIP SEWER AUTHORITY AND MILLCREEK TOWNSHIP, Defendants	)	JUDGE COHILL

INDEX OF DOCUMENTS
CONSIDERED BY AUGUST E. (GUS) MAAS, P.E.

1.	Special Study - Vols. I and II	MSA-MT 2139-2599
2.	Special Study Addendum	MSA-MT 2843-2947
3.	URS I&I Study	MSA-MT 2600-2812
4.	6/28/05 Allender letter to Kicher enclosing the Revision to the Special Study	MSA-MT 2815-2842
5.	7/12/05 DEP Approval of Special Study Addendum	MSA-MT 5003
6.	6/22/04 DEP Comments to Special Study Draft	MSA-MT 1418-1420
7.	8/13/03 Overflow Abatement Alternatives Report	MSA-MT 1333-1363
8.	3/24/04 Allender letter to Riedesel	MSA-MT 1383-1384
9.	2/18/04 Allender letter to Riedesel	MSA-MT 1387-1393
10.	6/21/91 Gill letter to DEP	MSA-MT 0871-0872
11.	1/13/05 Allender letter to Riedesel	MSA-MT 2969-2975
12.	Complaint	

13.	1992 Consent Order and Agreement	MSA-MT 6750-6772
14.	2003 Consent Order and Agreement	MSA-MT 6773-6796
15.	Bid Drawings dated 12/2005	MSA-MT 7517-7561
16.	Project Manual 12/2005	MSA-MT 6797-7516
17.	1/17/03 Allender letter to Riedesel with City Sewer System Flow Maps	CT20 00251-20 00259
18.	1/5/04 Allender letter to Riedesel with recommendations to increase pump station reliability	CT20 00301-20 00302
19.	2/18/04 Allender letter to Riedesel re homes threatened by sewage backup	MSA-MT6562-6565
20.	3/3/04 Allender letter to Riedesel re Design Changes at Kearsarge Pump Station	MSA-MT5131-5133
21.	3/24/04 Allender letter to Riedesel re Kearsarge Pump Station Capacity	CT20 00286-20 00287
22.	4/7/04 Allender letter to Riedesel re data on influent flows to Kearsarge Pump Station	CT20 00279-20 00280
23.	9/3/04 Allender letter to Riedesel re Basement Elevation Survey	MSA-MT6553-6557
24.	9/30/04 DEP letter to Millcreek approving Act 537 Special Study, Volumes I and II	DEP00627-00628
25.	6/04 Act 537 Special Study for the Kearsarge Pump Station & Tributary Sewers (Revisions 8/25/04)	MSA-MT00593-00608 DEP00587-00590
26.	10/1/04 Allender letter to Riedesel re suggested contingencies for Kearsarge Upgrade	CT20 00306-20 00307
27.	10/14/04 Allender letter to Riedesel with Table of Bypass Flows	CT20 00303-20 00305
28.	2/10/05 DEP letter to Riedesel re Proposed Amendments to Special Study	DEP00558-00559
29.	2/16/05 Allender letter to Riedesel with Scope of Study and Design Estimate	MSA-MT6069-6075

30.	6/2?/05 Kicher letter to Allender with commentary on Proposed Special Study Addendum	DEP00557
31.	7/7/05 Kicher Memorandum to Gilson re Kearsarge Special Study Addendum	DEP00555-00556
32.	7/26/05 DEP letter to Riedesel re Acceptance/Administrative Completeness Letter Amendment No. 1	MSA-MT5733-5736
33.	8/2/05 Allender letter to Riedesel re intended operation of pump station after addition of storage tank and pump station	MSA-MT6547-6548
34.	9/26/05 DEP letter to Riedesel enclosing WQM Permit No. 2583409-Amendment No. 1	MSA-MT5062-5063
35.	DEP Water Quality Management Permit No. 2583409, Amendment No. 1	MSA-MT5064-5067
36.	Internal Review and Recommendation	DEP00548-00550
37.	10/7/05 Allender letter to Riedesel with time estimate for compliance in removal of Kearsarge overflow from Walnut Creek	CT21 00349
38.	Letter from G. Allender to G. Riedesel - Enclosing maps of City Sewer System re old Ellsworth connection (1/17/94)	CT20 251-259
39.	Letter from G. Allender to G. Riedesel - Recommendations to increase reliability of Kearsarge Pump Station (1/5/04)	CT20 301-302
40.	Letter from G. Allender to G. Riedesel - Additional backflow preventors for homes threatened by sewage backup (2/8/04)	CT20 294-300
41.	Letter from G. Allender to G. Riedesel - Progress update on work at Kearsarge Pump Station (3/3/04); MTSA Kearsarge VFD Upgrade Summary - Minor Electrical Demolition (1/04)	CT20 288-293
42.	Letter from G. Allender to G. Riedesel - Estimate of storm water rates at Kearsarge Pump Station (3/24/04)	CT20 286-287
43.	Letter from G. Allender to G. Riedesel - Assessing influent flow data to Kearsarge Pump Station (4/7/04)	CT20 279-280

44.	Letter from G. Allender to G. Riedesel - Results of Kearsarge Area Basement Elevation Survey (9/3/04)	MSA-MT 6552-6561
45.	Memo from E. Kicher to R. Gilson - Enclosing Act 537 Kearsarge Special Study and discussing revisions (9/28/04)	DEP629-632
46.	Letter from R. Gilson to Millcreek Supervisors - Approving Act 537 Special Study (9/30/04)	DEP627-628
47.	Letter from R. Gilson to Millcreek Supervisors - Approving Act 537 Special Study, Vols. I and II (9/30/04)	CT20 308-309
48.	Letter from G. Allender to G. Riedesel - Suggesting contingencies to be designed into Kearsarge upgrade (10/1/04)	CT20 306-307
49.	Letter from G. Allender to G. Riedesel - Enclosing tabulation of water volume bypassed at Kearsarge (10/14/04)	CT20 303-305
50.	Letter from M. Zimmerman to G. Riedesel - Needed Amendments to Special Study for proposed changes (2/10/05)	DEP558-559
51.	Letter from G. Allender to G. Riedesel - Enclosing Scope of Study and Design Engineering Estimate (2/16/05)	CT21 334-340
52.	Letter from A. Folmar to G. Riedesel - Acceptance/Administrative Completeness Letter, Application No. 2583409, Amdnt. 1 (7/26/05)	DEP 553
53.	Memo from E. Kicher to R. Gilson - Enclosing Act 537 Special Study Addendum (7/7/05)	DEP 555-556
54.	Letter from E. Kicher to G. Allender - Comments on Special Study Addendum (6/2?/05)	DEP 557
55.	Letter from G. Allender to G. Riedesel - Intended operation of Kearsarge Pump Station after storage tank and pump station added (8/2/05)	CT21 331-332
56.	Letter from R. Gilson to G. Riedesel - Enclosing Kearsarge WQM Permit No. 2583409-Amendment No. 1 (9/26/05)	CT21 329-330
57.	Letter from R. Gilson to G. Riedesel - Enclosing Kearsarge WQM Permit No. 2583409-Amendment No. 1, APS ID No. 558205 (9/26/05)	DEP543-544

58.	PADEP Water Quality Management Permit, No. 2583409, Amendment No. 1, issued 9/26/05	DEP545-547
59.	PADEP Internal Review and Recommendation - WQM Permit 2583409	DEP548-550
60.	Letter from G. Allender to G. Riedesel - Estimate of time needed for compliance with removal of Kearsarge Pump Station overflow from Walnut Creek (10/7/05)	CT21 328
61.	Photo of Pump Station Buildings	MSA-MT7562
62.	Photo of Pump Station Buildings	MSA-MT7563
63.	Photo of Inside View of Pump Station	MSA-MT7564
64.	Photo of Location of Overflow Retention Facilities	MSA-MT7565
65.	PaDEP Domestic Wastewater Facilities Manual (Doc. ID #362-0300-001 - 10/97)	DEP00638-00755
66.	EPA Memo Re: Sizing Wet Weather Detention (7/14/95)	MSA-MT7649
67.	Brandy Run USGS Data	MSA-MT7650
68.	Map of Walnut Creek Drainage Area	MSA-MT7651
69.	Walnut Creek Sample Results -ECHD	ECHD0001
70.	NOAA Weather Data - 8/30/05 - 8/31/05	MSA-MT7653-7654
71.	Walnut Creek 1 Sample Results - Gannon University	MSA-MT7655
72.	Walnut Creek 2 Sample Results - Gannon University	MSA-MT7656
73.	Walnut Creek Sample Results - Hill Engineering	MSA-MT5214-5227
74.	Photo of Walnut Creek Immediately Upstream of the Overflow	MSA-MT7566
75.	Photo of Walnut Creek Looking Upstream Towards the Overflow	MSA-MT7567
76.	Photo of Walnut Creek Downstream of the Overflow	MSA-MT7568
77.	Photo of Walnut Creek Downstream of the Overflow	MSA-MT7569
78.	Point Precipitation Frequency Estimates From NOAA	MSA-MT7644-7648

79.	Addendum to Agreement - City of Erie/Millcreek Township/Erie Sewer Authority/Millcreek Township Sewer Authority	PL634-652

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA

ERIE COUNTY ENVIRONMENTAL COALITION, PENNENVIRONMENT, INC. and THE GAIA DEFENSE LEAGUE, Plaintiffs	)	
v.	)	CIVIL ACTION NO. 05-59 ERIE
MILLCREEK TOWNSHIP SEWER AUTHORITY AND MILLCREEK TOWNSHIP, Defendants	)	

CASES IN WHICH AUGUST E. (GUS) MAAS, P.E.
TESTIFIED AS AN EXPERT WITNESS IN LAST FOUR YEARS

CASE NO.	DESCRIPTION
1	Meadville Area Sewer Authority v. Leggett, Court of Common Pleas of Crawford County, Case No.2002-121
2	In re: Welch Foods, Inc., a Cooperative, Appeal of Pretreatment Permit No. 1-99, Before the Sewer Commissioner for the Borough of North East